

Need/Opportunity Title: Cone Penetrometer with Gamma-Ray Detection Capability

Need/Opportunity ID No: NV23-0001-11

Date:

Need/Opportunity Description: A method is needed to locate and identify radioactive waste in the subsurface which minimizes the amount of waste generated and minimizes the potential for worker exposure. Radioactive contamination buried beneath several feet of earth is shielded from surface detection and effectively hidden. The alternatives of digging or drilling pose a much greater risk of exposure and may generate an unacceptable waste stream. There are six to ten sites in Area 25 of the Nevada Test Site (NTS) including landfills, dumps, and leach fields which could benefit from this technology.

Need/Opportunity Category: Technology Need

Operations/Field Office: DOE/NV

Site: NTS

End User Program: Environmental Restoration Division (ERD)

Priority Rankings:

End User Program Ranking:

ACPC Priority: 2

Site Wide Ranking:

PBS Number Title: NV214 Industrial Sites

WBS Number: 1.4.1.2.1.3.03

Waste Stream: Not applicable.

Background: Radioactive materials have been disposed of in solid and liquid forms at various locations at the NTS. Traditional sampling methods for analysis pose a risk of exposure that is greater than need be.

“Baseline” Technology/Process: Drilling with frequent stops for radiation monitoring and sampling.

Cost: The conceptual cost estimate is about \$0.5 million for field labor and drilling subcontractors. This cost estimate is for the first waste dump only will be updated when more information becomes available.

How Long Will it Take: FY 1999

Issues Related to Baseline:

Technical: Radioactive material in the dump cannot be located or identified without drilling or excavation.

Cost: The cost savings for labor and waste management is estimated to be considerable but is not known at this time.

Regulatory: Not applicable.

Safety, Health, and the Environment: Potential exposure to personnel could occur when material is extracted from the earth by the drilling. Drilling will produce relatively large volumes of waste.

Stakeholder and Cultural: These waste sites are being investigated to ascertain their potential impact on groundwater and other receptors.

Other: None.

Need/Opportunity Description: A method is required for locating buried radioactive contamination in three-dimensional space, behind the shielding of earth material. Although intrusive penetration of the earth will be necessary, the disruptive nature of drilling and sampling can be avoided until the location of the most radioactive parts of the location are identified. With the information from this tool, a more intelligent decision can be made about the positions of sample borings and eventual monitoring wells. There are a number of radioactive waste dumps and leach fields at the NTS which would benefit from the availability of this instrument/technique.

Functional Performance Requirements: A radiation detection system that can be inserted into the subsurface without creating unnecessary waste, will allow the mapping of radioactive waste without the attendant hazards, and will reduce the risk of exposure to characterization workers.

Schedule Requirements: The primary objective of this need is a characterization scheduled to be completed in 1999. Several other units with similar characteristics are scheduled to be investigated over the next several years. Corrective Action Unit 143, Area 25, contaminated waste dumps are targeted for the cone penetrometer deployment in 1999.

Consequences of Not Filling Need/Opportunity: The possible consequences of investigating using conventional drilling techniques include worker exposure, generation of a radioactive waste stream, and the spread of radioactive contamination.

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